

इंटरनेट

मानक

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“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

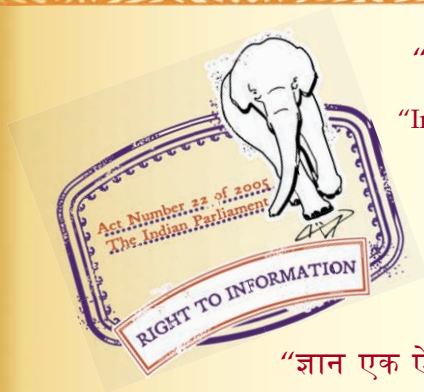
“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 10915 (1984): Terms, definitions and types of twist drills [PGD 32: Cutting tools]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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Indian Standard

TERMS, DEFINITIONS AND
TYPES OF TWIST DRILLS

1. Scope — Gives the geometrical terms and their definitions relating to twist drills. It also covers the different types of twist drills.

2. Terms and Definitions

2.1 Twist Drills — An end cutting tool with two cutting edges and having helical flutes for admission of coolant and ejection of cutting chips, with a shank for holding and driving. This is used for originating or enlarging holes.

2.2 Axis — The longitudinal centre-line of the drill.

2.3 Shank — That portion of the drill by which it is held and driven.

2.3.1 Taper shank (see Fig. 1A).

2.3.2 Parallel shank (see Fig. 1B).

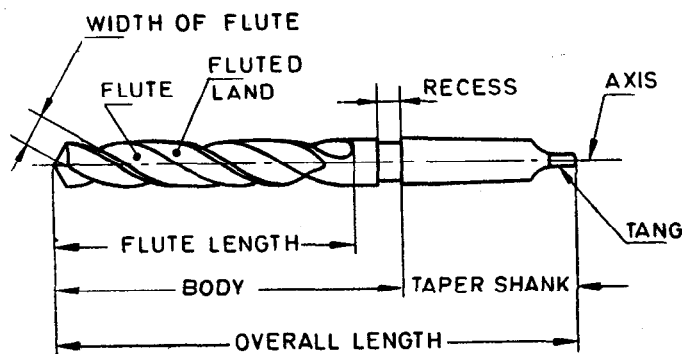


FIG. 1A

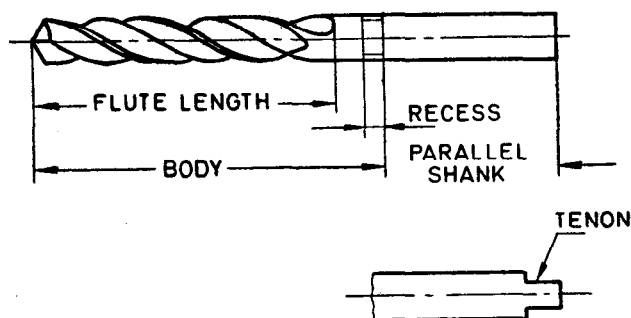


FIG. 1B

2.3.3 Parallel shank with tenon drive (see Fig. 1B).

2.4 Tang — The flattened end of a taper shank intended to fit into the slot in the socket and to be used for ejection purposes (see Fig. 1A).

2.5 Tenon — The flattened end of a parallel shank intended for driving purposes (see Fig. 1B).

2.6 Body — That portion of the drill extending from the shank to the chisel edge (2.27) (see Fig. 1A and 1B).

2.7 Recess — The cylindrical portion with reduced diameter in the body (see Fig. 1A and 1B).

2.8 Overall Length — The distance between two planes normal to the drill axis through the chisel edge (2.27) and the end of the shank (including any tenon or tang) respectively (see Fig. 1A and 1B).

2.9 Flute Length — The distance between two planes normal to the drill axis through the chisel edge (2.27) and the shank end of the flutes respectively (see Fig. 1A and 1B).

2.10 Flute — A groove in the body of the drill which, at the intersection with the flank (2.22) provides a major cutting edge (2.24), thus permitting removal of chips and allowing cutting fluid to reach the major cutting edge (see Fig. 1A).

2.11 Fluted Land — The helical portion of the body (2.6) including both the land (2.15) and the body clearance (2.18) (see Fig. 1A).

2.12 Width of Fluted Land — The distance between the leading edge of the land (2.17) and the heel (2.20), measured at right angles to the leading edge of the land (see Fig. 1A).

2.13 Web — The central portion of the drill situated between the roots of the flutes over the flute length (see Fig. 2).

Note — The point end of the web forms the chisel edge (2.27).

2.14 Web Thickness — The minimum dimensions of the web measured in a plane normal to the axis. The web thickness is usually measured at the point end.

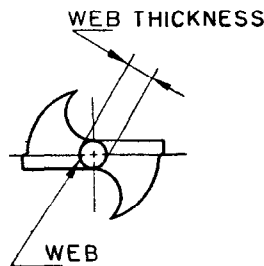


FIG. 2

2.15 Land — The cylindrical or conical leading surface of the drill (see Fig. 3).

2.16 Width of Land — The dimension measured at right angles to the leading edge of the land (2.17) across a land (2.15) (see Fig. 3).

2.17 Leading Edge of a Land (Minor Cutting Edge) — The edge formed by the intersection of a land (2.15) and a flute (2.10) (see Fig. 3).

2.18 Body Clearance — The portion of a fluted land reduced in diameter to provide diametral clearance (see Fig. 3).

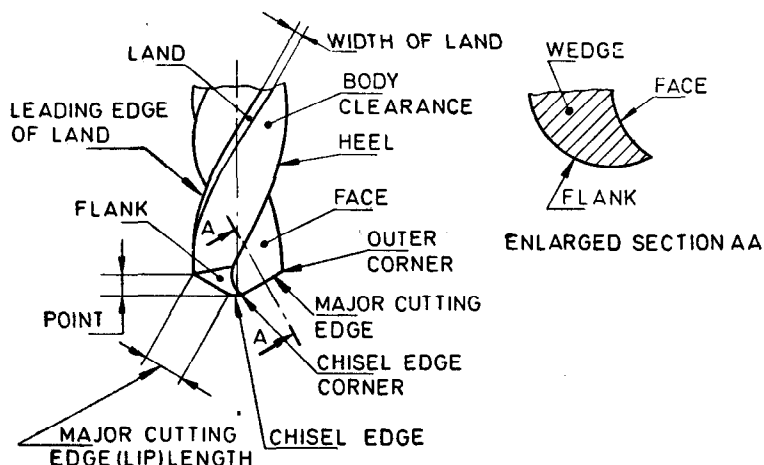


FIG. 3

2.19 Depth of Body Clearance — The radial distance between the land (2.15) and the corresponding body clearance (2.18). It is generally measured at the outer corners (see Fig. 3).

2.20 Heel — The edge formed by the intersection of a flute (2.10) and the body clearance (2.18) (see Fig. 3).

2.21 Point (Cutting Part) — The functional part of the drill comprised of chip-producing elements. The major cutting edges (lips 2.24), chisel edge (2.27), faces (2.23) and flanks (2.22) are therefore, elements of the point (cutting part) (see Fig. 3).

2.22 Flank (Major Flank) — The surface on the drill point bounded by the major cutting edge (2.24), the fluted land (2.11), the following flute and the chisel edge (2.27) (see Fig. 3).

2.23 Face — The portion of the surface of a flute adjacent to the major cutting edge (2.24) and on which the chip impinges as it is cut from the workpiece (see Fig. 3).

2.24 Major Cutting Edge (Lip) — The edge formed by the intersection of a flank (2.22) and face (2.23) (see Fig. 3).

2.25 Wedge — The portion of the point enclosed between a face (2.23) and a flank (2.22) associated with the major cutting edge (2.24).

2.26 Outer Corner — The corner formed by the intersection of a major cutting edge (2.24) and the leading edge of the land (2.17) (see Fig. 3 and 4).

2.27 Chisel Edge — The edge formed by the intersection of the flanks (2.22) (see Fig. 3 and 4).

2.28 Chisel Edge Corner — The corner formed by the intersection of a major cutting edge (2.24) and the chisel edge (2.27) (see Fig. 3 and 4).

2.29 Chisel Edge Length — The distance between the chisel edge corners (2.28) (see Fig. 4).

2.30 Major Cutting Edge (Lip) Length — The minimum distance between the outer corner (2.26) and the corresponding chisel edge corner (2.28) of the major cutting edge (2.24) (see Fig. 3).

2.31 Drill Diameter — The measurement across the lands (2.15) at the outer corners (2.26) of the drill measured immediately adjacent to the point (2.21) (see Fig. 5 and 6).

2.32 Body Clearance Diameter — The diameter of the body clearance (2.18) behind the lands (2.15) (see Fig. 5).

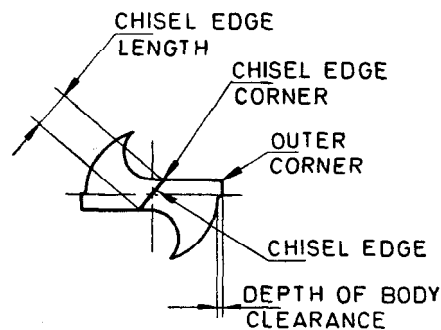


FIG. 4

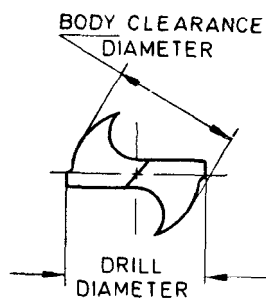


FIG. 5

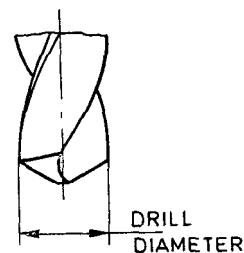


FIG. 6

2.33 Back Taper — The reduction in diameter (2.31) from the outer corners (2.26) towards the shank. It is expressed by the ratio of the reduction in diameter and the length of measurement.

2.34 Web Taper — The increase in web thickness (2.14) from the point (2.21) of the drill to the shank end of the flutes. It is expressed by the ratio of the increase in thickness and the length of measurement.

2.35 Rotation of Cutting — The primary motion of the cutting edge relative to the workpiece.

2.36 Right-Hand Cutting Drill — A drill that rotates in a clockwise direction relative to the workpiece when viewed on the shank end of the drill (counter-clockwise when viewed on the point end).

2.37 Left-Hand Cutting Drill — A drill that rotates in a counter-clockwise direction relative to the workpiece when viewed on the shank end of the drill (clockwise when viewed on the point end).

2.38 Lead of Helix — The distance measured parallel to the drill axis (2.2) between corresponding points on the leading edge of a land (2.17) in one complete revolution of the land (2.15) (see Fig. 7).

2.39 Helix Angle — The acute angle between the tangent to the helical leading edge and a plane containing the axis and the point in question.

Note — Helix angles may be classified as normal, slow and quick.

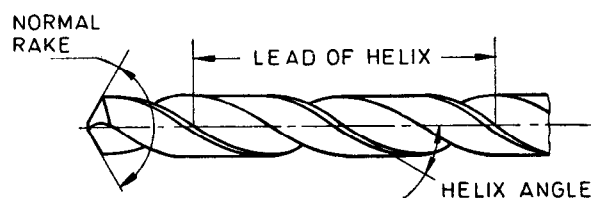


FIG. 7

2.40 Side Rake — The angle between a face (2.23) and a plane passing through the selected point, since these angles vary from point to point along the cutting edge, the definitions refer always to the 'selected point on the cutting edge', on the cutting edge and the drill axis, measured in the plane perpendicular to the radius at the selected point (see Fig. 8).

Note — When the selected point is at the outer corner, this angle is equivalent to the helix angle (2.39) (see Fig. 7).

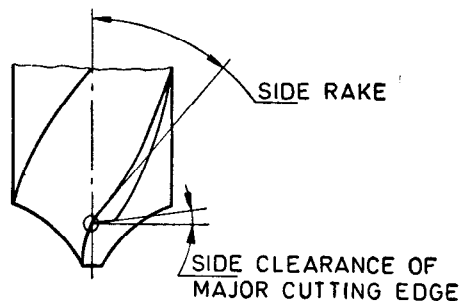


FIG. 8

2.41 Normal Rake — The angle between a face (2.23) and a plane passing through the selected point (since these angles vary from point to point along the cutting edge, the definitions refer always to the selected point on the cutting edge), on the cutting edge and the drill axis, measured in the plane perpendicular to the cutting edge (see Fig. 9).

2.42 Point Angle — Twice the angle formed by the drill axis and the projection of a major cutting edge in a plane through the drill axis and parallel to this cutting edge (see Fig. 7).

2.43 Side Clearance of the Major Cutting Edge — The angle between a flank (2.22) and a plane containing the cutting edge point (since these angles vary from point to point along the cutting edge, the definitions refer always to the selected point on the cutting edge), on the cutting edge, measured in the plane perpendicular to the radius at the selected point (see Fig. 8). This angle is usually specified and measured at the outer corner.

2.44 Normal Clearance of the Major Cutting Edge — The angle between a flank (2.22) and a plane containing the cutting edge (since these angles vary from point to point along the cutting edge, the definitions refer always to the selected point on the cutting edge) on the cutting edge measured in the plane perpendicular to the cutting edge at the selected point (see Fig 9).

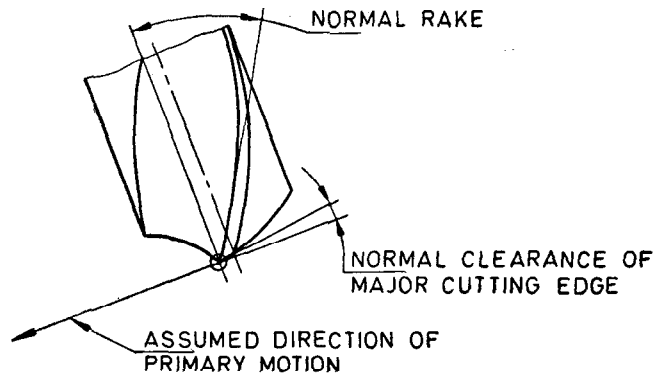


FIG. 9

2.45 Chisel Edge Angle — The obtuse angle between the chisel edge (2.27) and a line from the outer corner (2.26) to the corresponding chisel edge corner (2.28). The angle is measured by projection in a plane perpendicular to the drill axis (2.1) (see Fig. 10).

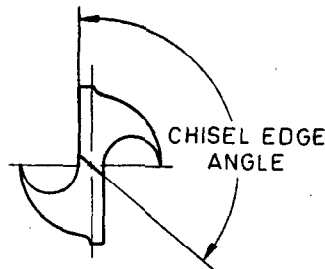


FIG. 10

2.46 Cutting Edge Height — The axial distance between the chisel edge and the outer corner of a drill.

3. Types of Twist Drills

3.1 Twist Drills, Parallel Shank, Stub Series, IS : 5100



3.2 Twist Drills, Parallel Shank, Jobber Series, IS : 5101

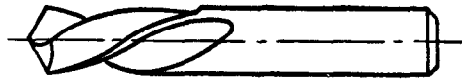


3.3 Twist Drills, Parallel Shank, Long Series, IS : 5102



IS : 10915 - 1984

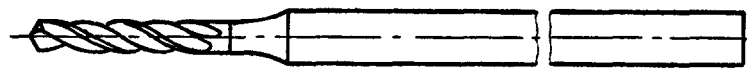
3.4 Twist Drills, Parallel Shanks, Stub Series, Left Hand Cutting for Automatics, IS : 5362



3.5 Twist Drills, Parallel Shank, Extra Long Series, IS : 7823



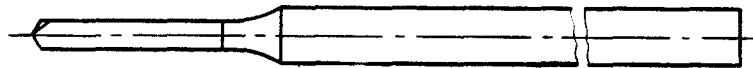
3.6 Micro-Drills, IS : 5363



TYPE A HELICAL FLUTED DRILL



TYPE B STRAIGHT FLUTED DRILL



TYPE C SPADE DRILL

3.7 Twist Drills, Morse Taper Shank, IS : 5103



3.8 Twist Drills, Morse Taper Shank, Long Series, IS : 8305



3.9 Twist Drills, Morse Taper Shank, Extra Long Series, IS : 7822



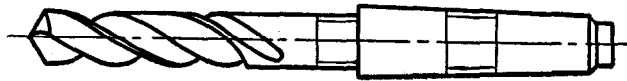
3.10 Twist Drills, Oversize Morse Taper Shank, IS : 5104



3.11 Twist Drills for Taper Pin Holes with Taper 1 : 50, IS : 5364



3.12 Twist Drills for Jig Boring Machines, IS : 7766



3.13 Core Drills, parallel Shanks, IS : 5365



3.14 Core Drills, Morse Taper Shanks, IS : 5366



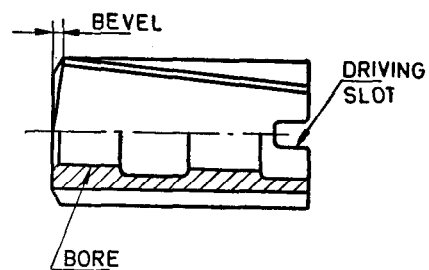
3.15 Twist Drills, Taper Square Shanks for Ratchet Braces, IS : 5105



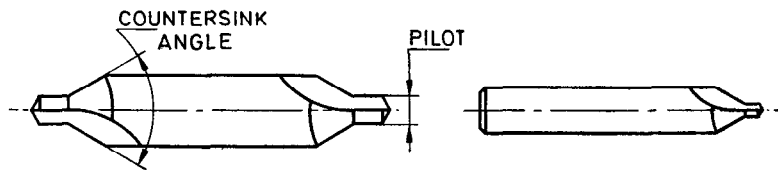
3.16 Twist Drills, Taper Square Shanks for Carpenter's Braces, IS : 5103



3.17 Shell Drills, IS : 7772



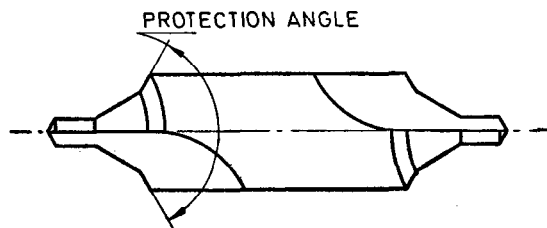
3.18 Centre Drills, Type A, IS : 6708



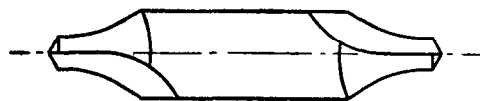
3.18.1 Countersink angle — The angle behind the pilot of a centre drill, which forms the cone in the workpiece on which the centre locates.

3.18.2 Pilot — The portion of a centre drill which cuts a hole from a solid before the commencement of the countersink angle.

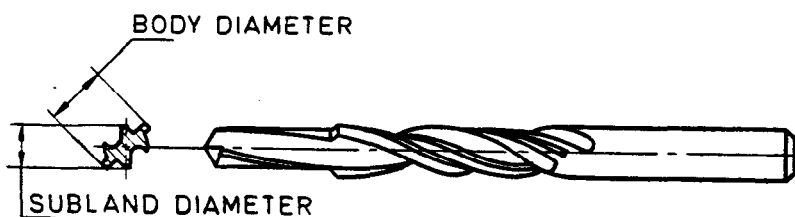
3.19 Centre Drills, Type B, IS : 6709



3.20 Centre Drills, Type R, IS : 6710

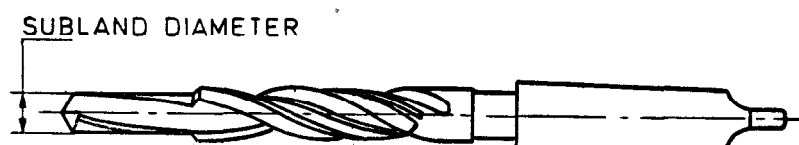


3.21 Subland Drills, Parallel Shank



3.21.1 Subland Diameter — The smaller diameter of a stepped drill, which extends to almost the flute length inside the body diameter,

3.22 Subland drills, Morse Taper Shank



EXPLANATORY NOTE

In order to bring it in line with the work done at ISO level, the Sectional Committee (EDC 45) responsible for preparations of this standard decided to publish a separate standard on terms, definitions and types of twist drills which were earlier covered in IS : 5099 'Technical supply conditions for twist drills'. In the preparation of this standard considerable assistance has been drawn from ISO 5419-1982 'Twist drills — Terms, definitions and types' issued by the International Organization for Standardization (ISO).

In comparison with the international standard, the definitions of twist drills and cutting edge height have been given additionally and also the definitions of helix angle has been modified in this standard. All the different types of twist drills for which Indian Standards are available have been included in this standard.

The list of Indian Standards related to twist drills is given below:

- 5100-1969 Twist drills, parallel shank stub series for right-hand cutting
- 5101-1969 Twist drills, parallel shank, jobber series
- 5102-1969 Twist drills, parallel shank, long series
- 5103-1969 Twist drills, morse taper shank
- 5105-1969 Twist drills, taper square shank for ratchet braces
- 5106-1969 Twist drills, taper square shank for carpenters braces
- 5362-1969 Twist drills, parallel shank, stub series, left-hand cutting for automatics
- 5363-1983 Micro-drills
- 5364-1969 Twist drills for taper pin holes with taper 1 : 50
- 5365-1978 Core drills parallel shanks
- 5366-1978 Core drills, morse taper shanks
- 6708-1977 Centre drills, Type A (*first revision*)
- 6709-1977 Centre drills, Type B (*first revision*)
- 6710-1977 Centre drills, Type R (*first revision*)
- 7766-1975 Twist drills for jig boring machines
- 7772-1975 Shell core drills
- 7822-1983 Twist drills with morse taper shanks extra long series
- 7823-1983 Twist drills with parallel shanks extra long series
- 8305-1976 Twist drills, morse taper shanks, long series



AMENDMENT NO. 1 NOVEMBER 1986

TO

IS:10915-1984 TERMS, DEFINITIONS AND TYPES OF
TWIST DRILLS

(Page 1, Fig. 1) - Substitute 'WIDTH OF
FLUTED LAND' for 'WIDTH OF FLUTE'.

(Page 1, clause 2.6) - Substitute the following
for the existing clause:

'2.6 *Body* - The portion of the drill extending from
chiesel edge to the start of recess (2.27)
(see Fig. 1A and 1B).'

(Page 4, Fig. 7) - Substitute 'NORMAL POINT
ANGLE' for 'NORMAL RAKE'.

(Page 7, clause 3.16) - Substitute 'IS:5106'
for 'IS:5103'.

(Page 7, clause 3.17) - Substitute the
following for the existing clause:

'3.17 *Shell Core Drills*, IS:7772.'

(EDC 45)

Reprography Unit, ISI, New Delhi, India